

Fry to Fingerling Growth Performance of Two Strains of Crucian Carp Fed Soymeal-Based Feeds

Results of ASA/China 2000 Feeding Trial 35-00-103

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ABSTRACT

Fry to fingerling growth performance of Beijing and Suzhou strains of crucian carp were compared in a 4-month feeding trial at the Beijing Xu Xing Zhang Fish Culture Farm. Crucian carp were grown in ponds using the ASA 80:20 production model and soymeal-based 41/11 fry and 36/7 fingerling feeds. Fish stocking density was 5,000 crucian carp fry and 1,000 silver carp fry per mu. Each fish strain was replicated in three ponds. The local Beijing strain of crucian carp grew from 0.6 g to 55 g in 122 days of feeding. Suzhou strain crucian carp imported from a fish farm in Suzhou, Jiangsu Province, grew from 0.6 g to 60 g in the same period. Growth of the Suzhou strain crucian carp was significantly better ($P<0.05$) than the local Beijing strain. FCR was 1.42:1 for the Beijing strain and 1.34:1 for the Suzhou strain, and was also significantly different ($P<0.05$). Net income was 15.4% higher and ROI 13.2% higher for the Suzhou strain crucian carp. Results of the trial indicate that the Beijing farm should upgrade its crucian carp breeding stock to a superior strain.

Chinese Currency and Production Unit Conversions:

RMB 8.26 = US\$1.00
15 mu = 1.0 hectare (ha)
kg/mu x 15 = kg/ha
1.0 kg = 2.2 lb
6 mu = 1.0 acre (ac)
kg/mu x 13.2 = lb/ac

INTRODUCTION

The American Soybean Association (ASA), in cooperation with Xu Xing Zhang Fish Culture Farm in Beijing, conducted a feeding trial to compare growth performance of the local strain of crucian carp bred at the Xu Xing Zhang Fish Culture Farm with a crucian carp strain imported from Suzhou, Jiangsu Province. The Beijing Xu Xing Zhang strain of crucian carp had exhibited slow growth and poor FCR in a fingerling to market growout trial conducted by ASA and the Xu Xing Zhang farm in 1999. The 2000 strain evaluation trial was conducted to determine the comparative growth performance of a crucian carp strain from Suzhou that was reported to exhibit better growth performance. The results of the 2000 comparison trial are reported in the paper.

MATERIALS AND METHODS

Six ponds of size 5.0-mu (0.33-ha) each at the Xu Xing Zhang Fish Culture Farm in Beijing were used for this trial. Pond water depth averaged approximately 1.5 m. Pond water was supplied from deep wells. All ponds were equipped with water exchange and stand-by aeration.

Fish were “summer flower” stage Beijing and Suzhou strain crucian carp fry with an average weight at stocking of 0.6 g per fish. The Beijing strain crucian carp were produced in the spring of 2000 at the Beijing Xu Xing Zhang Fish Culture Farm. Suzhou strain crucian carp were produced at the Suzhou Fish Stock Breeding Farm in Suzhou, Jiangsu Province, and shipped by air to the Beijing Xu Xing Zhang farm. Crucian carp fry were stocked in the six trial ponds at a density of 5,000 fish per mu, together with 1,000 silver carp fry per mu. Fish of both strains were of uniform size and age at stocking.

Crucian carp in all six trial ponds were fed the ASA 41/11 fry feed from pond stocking to fish size 3 g. The 41/11 feed was fed in crumble form (Table 1). At fish size 3 g, the crucian carp were weaned to the ASA 36//7 fingerling feed fed in extruded, floating pellet form (Table 1). Initial extruded pellet size was 1.5 mm. Crucian carp were fed to satiation, with fish in all six ponds being fed the same amount and on the same schedule.

Fish in all ponds were sampled once per month on the same date each month to monitor growth performance. At the conclusion of the trial, all ponds were drained and the crucian carp and silver carp fingerlings in each pond counted and weighed to determine average fish weight, gross and net production, feed conversion ratio (FCR) and survival. Production input costs were recorded throughout the trial and net income and ROI calculated at the end of the trial.

RESULTS

Crucian carp were fed a total of 122 days between 10 June and 10 October 2000. Beijing strain crucian carp grew from 0.6 g to 55 g with an FCR of 1.42:1 (Figure 1; Table 2). Suzhou strain crucian carp grew from 0.6 g to 60 g with an FCR of 1.34:1 (Figure 1; Table 2). Fish growth and FCR were both significantly different ($P<0.05$), with the Suzhou strain exhibiting better performance.

Average gross production of crucian carp was 253.8 kg/mu for the Beijing strain and 268.9 kg/mu for the Suzhou strain (Table 2). Silver carp production was 98.3 kg/mu in the Beijing strain ponds and 101.7 kg/mu in the Suzhou strain ponds (Table 2). The ratio of fed crucian carp to filter feeding silver carp was 72/28 for the Beijing strain crucian and 73:27 for the Suzhou strain crucian.

Average crucian carp survival was 92.3% for the Beijing strain and 89.7% for the Suzhou strain (Table 2). There was no significant difference ($P>0.05$) in survival rate for the two crucian carp strains.

Net income per mu was RMB 774.79 for the Beijing strain crucian carp at market prices of RMB 11 for fingerling crucian carp and RMB 3/kg for fingerling silver carp (Table 2). Net income per mu was RMB 894.34 for the Suzhou strain crucian carp (Table 2). Average ROI was 34.2% for

the Beijing strain crucian carp and 38.7% for the Suzhou strain (Table 2). Net income and ROI were 15.4% and 13.2% higher, respectively, for the three Suzhou strain trial ponds than the three Beijing strain trial ponds.

SUMMARY AND CONCLUSIONS

The Beijing and Suzhou crucian carp strains both exhibited reasonable growth and feed conversion efficiency in this ASA trial. However, better fish growth, feed conversion, net income and ROI collectively indicated that the Suzhou strain was a better performing strain of crucian carp than the Beijing strain. Results of the trial indicate that the Beijing farm should upgrade its crucian carp breeding stock to a superior strain.

All fish fed well on the ASA 41/11 crumble fry and 36/7 extruded fingerling feeds. Crucian carp maintained good health and feeding efficiency with the ASA soymeal-based feeds.

ACKNOWLEDGEMENTS

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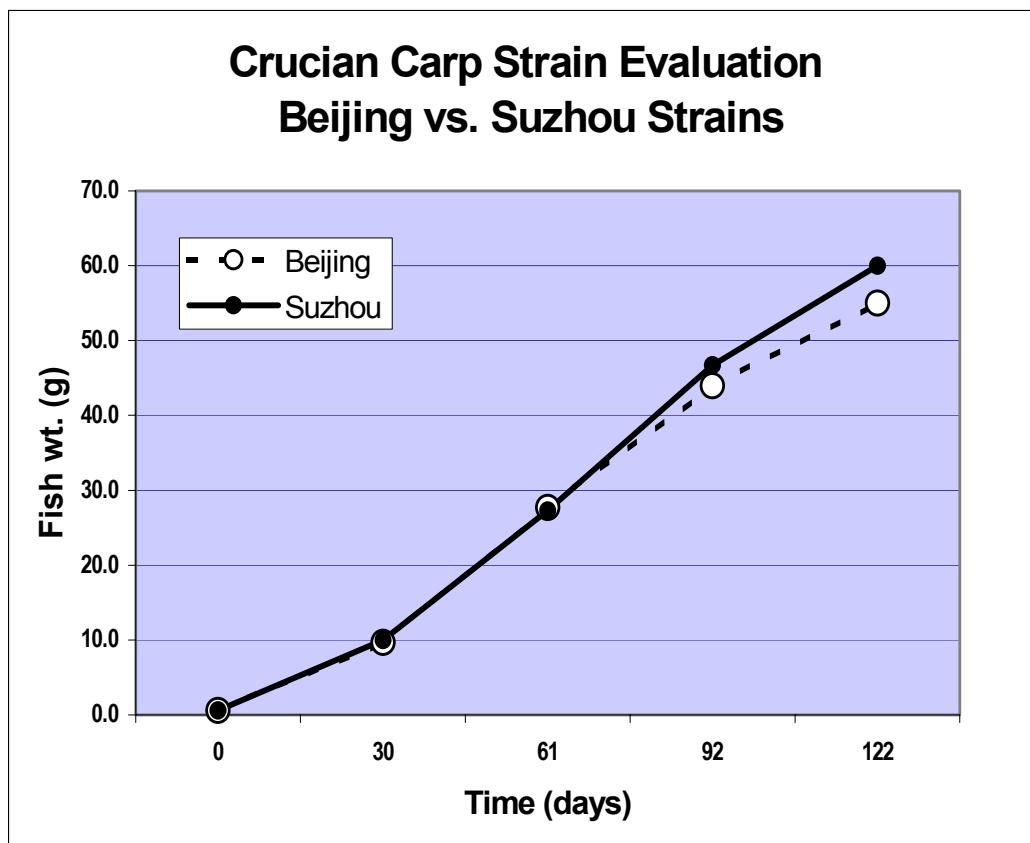


FIGURE 1. Growth curves for Beijing and Suzhou strain crucian carp produced in ponds at a density of 5,000 crucian carp fry per mu. Growth and FCR for the Suzhou strain were significantly better than for the Beijing strain and indicate the Beijing fish farm should upgrade its crucian carp breeding stock to a superior strain.

Table 1. Formulations for the soymeal-based ASA 41/11 fry and 36/7 fingerling feeds used in the 2000 crucian carp strain evaluation trial conducted at the Xu Xing Zhang Fish Culture Farm in Beijing, China.¹

Ingredient	41/11 Fry Feed	36/7 Fingerling Feed
Soybean meal 47.5	46.30	46.30
Wheat, SWW	13.00	19.00
Wheat middlings	-----	8.00
Corn gluten meal 60%	15.00	10.00
Fishmeal, Anchovy 65/10	14.00	8.00
Fish oil	4.03	4.58
Soy oil	4.00	-----
Soy lecithin	1.50	1.50
Ca phosphate mono	1.70	2.20
Vit PMX Roche 2118	0.20	0.15
Min PMX F-1	0.25	0.25
Ethoxyquin	0.02	0.02
Total	100.00	100.00

¹The numerical component of the feed description refers to the percentage of protein and fat, respectively, in the ration, e.g. 32/6 indicates 32% crude protein and 6% crude fat.

TABLE 2. Results of the 2000 ASA aquaculture trial at the Beijing Xu Xing Zhang Fish Culture Farm that compared fry to fingerling growth performance and economic return of Beijing and Suzhou strain crucian carp.

CrC ¹ strain	Stocking size (g)	Stocking rate (CrC/mu)	No. days fed	Harvest wt. (g)	P _G ³ (kg/mu) CrC SiC ²	Ratio CrC:SiC	Survival (%)	FCR	Net income (RMB/mu)	ROI (%)
Beijing	0.6	5,000	122	55 ^a	253.8 98.3	72:28	92.3 ^c	1.42 ^d	774.79	34.2
Suzhou	0.6	5,000	122	60 ^b	268.9 101.7	73:27	89.7 ^c	1.34 ^e	894.34	38.7

¹CrC = Crucian carp

²SiC = Silver carp

³P_G = Gross pond production

Treatment means followed by different superscripted letters are significantly different (P<0.05); treatment means followed by the same superscripted letter are not significantly different (P>0.05);